

IN THE CLAIMS:

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Claim 1 (original): A method for generating backup files in a computer system, comprising:  
generating a full backup file corresponding to a first time for a set of objects in the computer system;  
generating at least one incremental file for said set of objects after said first time;  
identifying a target object within said set of objects for the generation of cumulative backup files; and  
generating at least one cumulative backup file corresponding to a second time, after said first time, for said target object, wherein said generating of said at least one cumulative backup file is performed off-line.

Claim 2 (original): A method for generating backup files according to claim 1, wherein said generating of said at least one cumulative backup file includes analyzing at least one incremental file generated between said first and second time.

Claim 3 (original): A method for generating backup files according to claim 2, wherein said analyzing of said at least one incremental file is performed in reverse chronological order, starting from said second time.

Claim 4 (original): A method for generating backup files according to claim 1, further comprising restoring said target object to said second time by processing said full backup file and said at least one cumulative backup file.

Claim 5 (original): A method for generating backup files according to claim 1, further comprising restoring said target object to a third time later than said second time by processing a full backup file, said at least one cumulative backup file and any incremental backup files generated between said second time and said third time.

Claim 6 (original): A method for generating backup files according to claim 1, wherein said identifying includes identifying a related subset of files as said target object for a cumulative backup file.

Claim 7 (original): A method for generating backup files according to claim 1, wherein said identifying includes identifying a volume as said target object for a cumulative backup file.

Claim 8 (original): A method for generating backup files according to claim 1, wherein said identifying includes identifying a directory as said target object for a cumulative backup file.

Claim 9 (original): A method for generating backup files according to claim 1, wherein a user identifies the target object.

Claim 10 (original): A method for generating backup files according to claim 1, further comprising monitoring and analyzing restore operations in said computer system, wherein said target object is identified in response to said monitoring and analyzing.

Claim 11 (original): A method for generating backup files according to claim 1, wherein said identifying of said target object is designed to meet a condition of bounded restore time for said target object.

Claim 12 (original): A method for generating backup files according to claim 1, further comprising controlling the frequency of generating at least one of a full, incremental and cumulative backup.

Claim 13 (original): A computer-readable medium having computer-executable instructions for instructing a client computer to perform the method of claim 1.

Claim 14 (currently amended): A data structure stored in a computer readable medium for representing cumulative backup information for a target object generated according to the method of claim 1, comprising:

storage block mappings for said target object; and  
cumulative backup data representative of change of the target object relative to a full backup wherein said data representative of said change is stored in the format of MTF  
Microsoft tape format.

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Claim 15 (original): A method for generating backup files in a computer system, comprising:  
generating a full backup file corresponding to a first time for a set of objects in the computer system;  
generating at least one incremental file for said set of objects after said first time;  
identifying a target object within said set of objects for the generation of cumulative backup files; and  
generating at least one cumulative backup file corresponding to a second time, after said first time, for said target object, wherein said generating of said at least one cumulative backup file includes analyzing at least one incremental file generated between said first and second time.

Claim 16 (original): A method for generating backup files according to claim 15, wherein said analyzing of said at least one incremental file is performed in reverse chronological order, starting from said second time.

Claim 17 (original): A method for generating backup files according to claim 15, wherein said generating of said at least one cumulative backup file is performed off-line.

Claim 18 (original): A method for generating backup files according to claim 15, further comprising monitoring and analyzing restore operations in said computer system, wherein said target object is identified in response to said monitoring and analyzing.

Claim 19 (original): A method for generating backup files according to claim 15, wherein said identifying of said target object is designed to meet a condition of bounded restore time for said target object.

Claim 20 (original): A method for generating backup files according to claim 15, further comprising controlling the frequency of generating at least one of a full, incremental and cumulative backup.

Claim 21 (original): A computer-readable medium having computer-executable instructions

for instructing a client computer to perform the method of claim 15.

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Claim 22 (original): A computer system, comprising:

a plurality of servers having at least one connection to a communications network;  
and

a plurality of storage components for the storage of backup information for a target object in the form of full, incremental and cumulative backup information;

wherein said full backup information is generated at a first time and said cumulative backup information is generated at a second time, wherein said storage components are accessible over said at least one connection via said plurality of servers, wherein said cumulative backup information is generated off-line and wherein said target object may be efficiently reconstructed to said second time associated with said cumulative backup information.

Claim 23 (original): A computer system according to claim 22, wherein the reconstructing of said target object to said second time includes processing at least one cumulative backup file associated with said second time and a full backup file associated with said first time.

Claim 24 (original): A computer system according to claim 22, wherein the reconstructing of said target object to a third time later than said second time is performed by processing at least one cumulative backup file associated with said second time, a full backup file associated with said first time, and any incremental backup files generated between said third time and said second time.

Claim 25 (original): A computer system according to claim 22, wherein said plurality of storage components store backup information for said target object according to a user specification as to which subset of files is said target object.

Claim 26 (original): A computer system according to claim 22, wherein said plurality of storage components store backup information for a volume as said target object.

Claim 27 (original): A computer system according to claim 22, wherein said plurality of

storage components store backup information for a directory as said target object.

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Claim 28 (original): A computer system according to claim 22, wherein at least one of said plurality of servers generates said backup information in response to monitoring and analyzing an inefficiency of a system restore operation.

Claim 29 (original): A computer system according to claim 22, wherein the generation of backup information is designed to meet a condition of bounded restore time for the target object.

Claim 30 (original): A computer system according to claim 22, wherein the generation of a cumulative backup file includes the analysis of at least one incremental file generated after said first time associated with the full backup information.

Claim 31 (original): A computer system according to claim 30, wherein said analysis of said at least one incremental file is performed in reverse chronological order, from said second time to said first time.

Claim 32 (original): A computer system, comprising:

    a plurality of servers having at least one connection to a communications network;  
    and

    a plurality of storage components for the storage of backup information for a target object in the form of full, incremental and cumulative backup information;

    wherein said full backup information is generated at a first time and said cumulative backup information is generated at a second time, wherein said storage components are accessible over said at least one connection via said plurality of servers, wherein said target object may be efficiently reconstructed to said second time associated with said cumulative backup information and wherein the generation of a cumulative backup file includes the analysis of at least one incremental file generated after said first time associated with the full backup information.

Claim 33 (original): A computer system according to claim 32, wherein said analysis of said

at least one incremental file is performed in reverse chronological order, from said second time to said first time.

Claim 34 (original): A computer system according to claim 32, wherein said analysis of said at least one incremental file is performed off-line.

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